A POPULAR TREATISE ON THE COMMON INDIAN SNAKES.

Illustrated by Coloured Plates and Diagrams.

BY

Major F. Wall, I.M.S., C.M.Z.S.

Part IX with Plate IX and Diagram 1.

(*Continued from page 735 of Volume XVIII.*)

The Common Wolf-Snake (*LYCODON AULICUS*).

Nomenclature (*a*) *Scientific.*—The generic name (Gr. λυκος wolf and οδους tooth) originated with Fèrrusac* in 1826, and has reference to the long teeth in the upper and lower jaws which, from their situation and superior length, resemble the canine teeth of wolves and dogs. It is these long teeth which mislead many who inspect the mouth carelessly, into supposing the snake a venomous one. As a matter of fact they are solid, nor canaliculate.

The specific title (Latin=a house dweller) was introduced by Carl Linné in 1754, and emphasises the fact that it is usually met with inside habitations.

(*b*) *English.*—The Common Wolf-Snake seems to me the best name for it.

(*c*) *Vernacular.*—Though so common I know very few names for it. It is frequently confused by natives with the krait, and known by the same name locally as its poisonous relative. Thus Mr. DeAbreu tells me it is called "krait" in Behar, Willey† says it shares with the Ceylon Krait (*B. ceylonicus*) the name "tel karawala" in Ceylon. Baboo Awmoola Ruttum Bysack gives "kaurialla" as one of the names for the common krait (*B. cæruleus*), but I think it is more correctly applied to the common wolf-snake. I have heard this name given several times, and it appears to refer to the marks on the back resembling the little cowry shell, "kaurialla" or "kauriwalla" implying a wearer of cowries. A European subordinate with some knowledge of snakes told me that the common name in the Kheri District (U. P.) for it is "garar". In S. India Father Bertrand tells me it is one of the snakes called "Soovar pambu" or "wall

* Bull. de Science, Nat., p. 238.

† Spol. Zeylan, 1906, p. 229.

snake". Colonel Dawson informs me that in Travancore, this and *L. travancoricus* with other species are called "shunguvarian," the Malayalam word for conch shell being "shungu" alludes to the marks on the back. I heard it called "choorta" in Cannanore, but again here the term was loosely applied.

Colour and Varieties.—I cannot do better than first quote from Boulenger (Cat., Snakes, 1893, Vol. 1, p. 353).

"*A.*—Labials without spots; a triangular whitish blotch on each side of the occiput, the two sometimes confluent and forming a collar; back with whitish cross bands bifurcating on the sides (*L. aulicus*, Linné).

B.—Labials without spots; a whitish collar and a few (2—5) whitish cross bands on the anterior part of the body.

C.—Labials without spots; no collar; no dorsal spots or bands.

D.—Some or all of the labials with a brown spot; a whitish collar or a triangular whitish blotch on each side of the occiput; back with whitish cross bands bifurcating on the sides, or with a dorsal series of quadrangular blotches, or with white lines disposed irregularly or forming a wide-meshed net work (*L. capucinus*, Boie).

E.—Each upper labial with a brown spot: no collar; no light spots or lines (*L. unicolor*, Boie)."

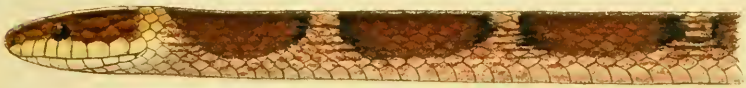
Boulenger's variety *D.* includes three varieties the β, γ, and δ of Günther*. I cannot see the justification for recognising any of the above varieties, which appear to me completely connected, unless var. *B.*, about which I am not certain, deserves special mention.

I find on referring to my note books that I have examined, and remarked upon 191 specimens from widely separated localities in India, Burma, and Ceylon. Between specimens that have yellow or yellowish cross bars in the whole body-length extending often on to the tail, and those with no marks at all I find every degree of variation. In some not even the occipital band is to be seen, in others it alone may be obscure or distinct, in others two, three, four, or many cross bands may be visible, the anterior always most so. Varieties *A.* to *E.* therefore appear to me completely connected. I find that the colour of the lips to which Boulenger attaches importance varies too. Often the upper is uniform yellow or yellowish, often

* Rept., Brit. Ind. 1864, p. 316

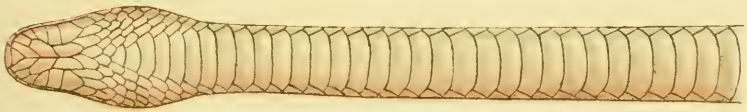
1.

2.



3a.

3b.



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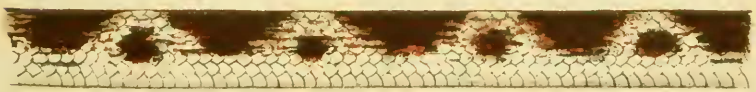


4.

J. G. del. J. Green, Chromo

THE COMMON INDIAN SNAKES, (Wall).

1, 2, 3. Lycodon aulicus, *harmless, nat size.*

4. Lycodon striatus, *harmless,* × 1.

again more or less mottled with brown especially anteriorly, or some of the labial shields bear a single median brown spot.

There appear to me to be but two varieties and these are so marked that I am inclined to think they must breed true "inter se."

In variety *typica* the brown varies from the light hue seen in figure 1 to the dark-brown of figure 2. The bars are yellow or yellowish never quite white in life, though the yellow becomes white rapidly in spirit. They broaden laterally and dissolve into a net-work pattern in which the scales involved are outlined with yellow. This reticulation is not clearly shown in figure 3 of our plate. It so often happens that the cross bars fade away posteriorly, that in a large number of specimens one cannot count them in the whole body-length. I have therefore noted in a large series the bars that can be counted in the anterior *half* of the body (not including the tail), and find that they usually vary from 9 to 18. In some uncommon examples they may be very few, or even absent, the latter rarities conforming to the types of *unicolor* (Boie), and *hypsirhinoides* (Theobald). Further, the scales involved in the interval between the first and second bars (not the bar on the back of the head) vary from 5 to 10, and this is of importance in determining the uncommon specimens in which but two or three bars are visible. *Typica* is the common variety distributed throughout Indian and Burmese limits. In the second variety for which I propose the name *oligozonatus* the ground colour is always dark as in figure 2 of our plate or darker still approaching black. The bars are white, not yellowish. Laterally they dilate without dissolving into a net-work. They are distinct in the *whole* body-length numbering from 11 to 19. They are thus about half as numerous as in variety *typica*. The number of scales involved vertebrally in the interval between the 1st and 2nd bars varies from 12 to 19. The lips are white not yellow. Of this I got several specimens in Cannanore and have seen one from Bellary, but no others. It probably occurs only in S. India where it is far less common than *typica*.

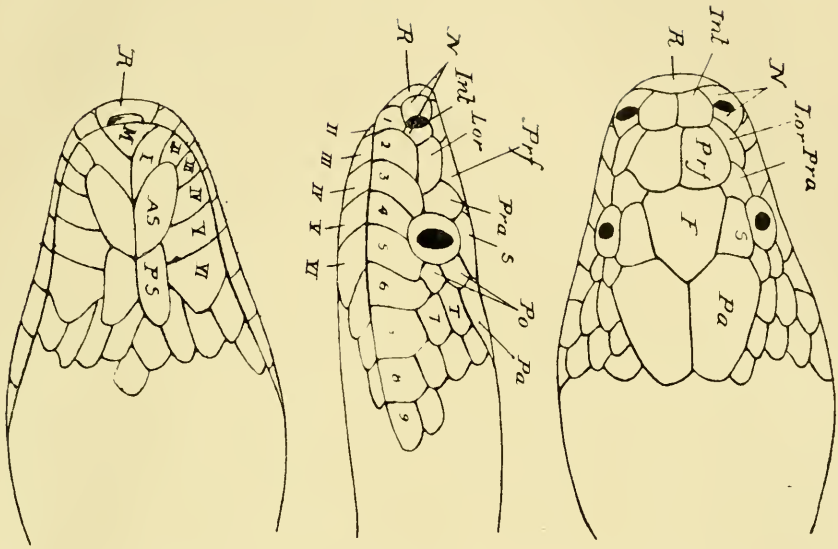
In both varieties the underparts are pearly-white, with in *typica* sometimes a pinkish tinge.

Dimensions.—It grows to about two-and-half feet, but specimens over two feet are uncommon. I have records of only 19 over that length, and all my largest are females. My largest ♂ record is 2

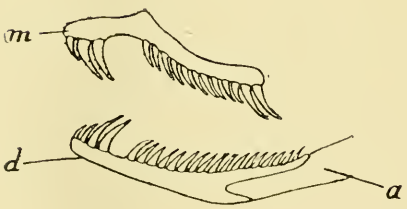
feet $3\frac{1}{8}$ inches, and I have had four ♀ ♀ larger, the maximum length being 2 feet 5 inches. Mr. Millard, however, gives me two records in excess of my figures. One is 2 feet $7\frac{1}{2}$ inches, and another 2 feet 9 inches, the sex in both cases was not noted.

Bodily configuration, physiognomy, etc.—The Wolf-Snake is rather slender in form, the body cylindrical in outline or slightly flattened ventro-vertebrally and of much the same girth in the whole body length. The head is decidedly flattened, the snout broad, and rounded with an obtuse transverse ridge in front. The neck is sufficiently constricted to be distinctly evident. The nostril is moderate and occupies the full depth of the suture between the nasal shields. The eye is rather small and quite black so that no idea of the shape of the pupil can be discerned in life ; but shortly after death when the lens becomes opalescent from post mortem changes, or after immersion in spirit the pupil is seen to be vertical. The tongue is pinkish with white tips. The belly is obtusely keeled on each side, a feature favorable to clambering efforts. In this snake as in the dhaman, and many other species the "angulation" as it is usually called reminds one in section of a boat (see figure 1 B, Diagram 1, facing page 230 of Volume XVIII of this Journal). The tail is rather short being about one-sixth the total length of the snake. The whole snake is glossy owing to the smooth and polished surfaces of the scales; a circumstance which has not escaped the Singhalese whose name for it "tel" karawala, implies "oily."

Identification.—The first thing to look at is the loreal which in this snake in common with a few others touches the internasal (see figures A and B of Diagram). This relationship of these two shields is only to be seen in 5 of the 11 known species of this Genus, in all the species of the Genera *Amblycephalus* and *Trachischium*, in *Xylophis perroteti* and in certain specimens of some *Hypsirhina*. In all the species of *Lycodon* that concern us the scales are in 17 rows in midbody, whereas this number of rows is not met with in any other species and genera just referred to. In *L. aulicus* and *striatus* the 1st and 2nd labials touch the nasal shields in the other three species the 1st only. It now remains to distinguish *aulicus* from *striatus*. In the former there are normally 9 supralabials, in the latter only 7 or 8. In the former the præocular frequently but by no means always touches the frontal, in the latter it never does so. In the

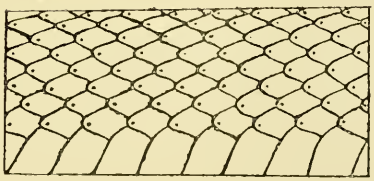


LYCODON AULICUS (+2).



E

(*m*) maxilla, (*d*) dentary and (*a*) articular parts of mandible of *L. aulicus* (enlarged).



To show scales with apical pits.

COMMON INDIAN SNAKES (WALL).

former the belly shields (ventrals) are angulate, in the latter they are not. The former grows to 2½ feet, the latter to less than 1½. Whilst both are common in Peninsula India and Ceylon, the former extends East beyond the longitude of Calcutta, the latter does not. To sum up, the essential points in identification are (1) a loreal touching the internasal, (2) scale rows 17 in midbody, (3) nasal touching the 1st and 2nd labials and (4) 9 supralabials.

Haunts.—Of all the snakes that seem to seek out, and profit by a human environment the Common Wolf-Snake is the most conspicuous. I should think that fully half the snakes met with inside habitations throughout India would prove to be this species, and it certainly is far more frequently encountered inside bungalows, and outhouses than outside them. Not only is it a very frequent tenant of houses such as those occupied by the European population in Cantonments, but it frequently obtrudes itself into densely populated parts, such as bazaars, native towns, jails, etc., and is no rarity in the business quarters of our large Indian cities. I not infrequently have one brought in from the regimental lines, bazaars and jails, and have had it from inside regimental and Cantonment hospitals. Mr. Millard tells me he has "frequently had specimens sent to the Museum which have been killed in houses in the Fort at Bombay." Like many other snakes it likes to insinuate itself into the crevices of loose brickwork such as the foundations and walls of buildings. Here it conceals itself during the day emerging at nightfall in quest of food. Along the outer walls skirting the jail at Cannanore I rarely passed without finding the sloughs of this snake issuing from holes in the face of the masonry, and have often found it in similar situations elsewhere.

In houses it very frequently climbs into the roof, and I have several times known or had specimens sent me which had dropped on to the floors of rooms, verandahs, barracks, etc.

Disposition.—The Common Wolf-Snake is a very lively little customer, which usually on being discovered slips away hastily if circumstances permit. If pursued, or any attempt made to catch it, or obstruct its path it strikes out boldly without hesitation planting its teeth into whatever thwarts its progress, and I have been bitten many times in trying to effect its capture. If in the open, and baulked in its endeavours to escape it will frequently coil itself

into a heap and remain stationary; and if worried will hide its head beneath its coils. Often too while lying thus it fixes its coils rigidly so that one can toss it into the air without it releasing its folds, as one might do a piece of knotted cane. A visit paid to such a specimen in its cage an hour or so later will probably show its courage restored, and it will inflict or endeavour to inflict a wound. Like most other snakes however it soon gets accustomed to being handled and will then suffer itself to be withdrawn from its cage without anger though it usually struggles to elude one's grasp. Mr. F. Gleadow tells me he "saw one in a climber in his verandah one night, and while examining him to see whether it was a *Lycodon* or a *Bungarus* with the aid of a hurricane lamp, he let out at me like lightning, and scratched my nose. It was a very smart stroke indeed. Nobody had touched him." Gunther* says of it: "It is of fierce habits and defends itself vigorously." Mr. Millard writes to me: "It is of a somewhat fierce disposition, and when first caught will usually turn and bite freely." Colonel Dawson too in a letter to me remarks on the fierceness of its nature.

Mice not infrequently fall victims to this snake, a fact which in itself speaks more eloquently than any remarks can do for the intrepid nature of such a diminutive reptile. Mice or at least individuals amongst them are most formidable antagonists for small creatures to encounter and I have collected several interesting records showing that a single one will not only defend itself against the snake or snakes into whose cage it has been put as food, but will sometimes actually turn the tables, fight, overpower, and devour the snake.

There is no doubt that this snake is responsible for a large number of cases of snake bite in India every year, a circumstance to which its commonness, courage, irascibility, nocturnal habits, and predilection for man's environment all contribute.

As the snake is nearly always pronounced a krait by Europeans and natives alike it is one of those snakes which has helped most to swell the list of reputed antidotes to snake poison, for anything given internally, or applied locally under the circumstances gets the credit of having averted the otherwise supposed inevitable fatality.

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* Rept. Brit. Ind., 1864, p. 316.

In a nervous subject, such as the native frequently is, a bite even from this harmless wolf-snake may prove fatal. Thus Dr. Willey* records a case in Ceylon of a woman who was bitten on the right forearm by a snake of this species one night, and who died in consequence, no doubt from fright.

In the *Indian Medical Gazette* of November 1st, 1870, Dr. Ewart reports the following case:—

"This morning, August 22nd, on visiting the General Hospital, I was informed that one of the punkah-coolies had been bitten, about 8-30 the night before, by a krait, whose venom is virulently poisonous. The man, it appears, had been sleeping, and on awaking he found something crawling over the right shoulder, and immediately experienced a stinging sensation about the middle of the acromion process. He was then under the impression that he had been bitten by a snake, and on procuring a light, a very lively snake was captured.

"The site of the bite was examined by Mr. Knight, the Assistant Apothecary, who declares he discovered a small puncture, on which there was a small quantity of coagulated blood. He is also positive that the tissues around, to the size of a two-anna piece, were puffed and swollen. Patient's pulse was irregular, and he was much alarmed and agitated; the surface of the body was cold; countenance anxious: pupils normal; quite conscious and intelligent; no dimness of vision, or vertigo.

"About four minutes after the man had been bitten, the part was freely scarified, and the cupping glass applied. Ammonia was given repeatedly at short intervals. Rum was also freely administered, and means were taken to prevent sleep.

"When the patient was presented to (us) as a specimen of snake-bite cured by cupping, ammonia, and rum, I expressed my doubts, after an examination of the seat of scarification, whether he had been bitten at all; and if he had been bitten, whether the snake was poisonous.

"I submitted the snake to Dr. Fayrer, C.S.I., who pronounced it to be the '*Lycodon aulicus*' perfectly innocent. It is something like the Krait (*Bungarus cæruleus*), and often gets blamed accordingly."

It is in such a case as this that the stimulating remedies which have

* Spolia Zeylan. 1906, p. 228.

enjoyed so great a reputation in the treatment of snake-bite are of real benefit, such for instance as brandy, ammonia, and strychnia. These agents have no influence in reducing or destroying the poisonous properties of snake venom, they are useless agents in the treatment of snake *poisoning*, but invaluable remedies in snake *bite*, a very different condition—where they act by counteracting the depressing influence which fright exerts upon the heart.

Habits.—The two most obvious traits in its character are its nocturnal habit, and its clambering propensities. It is seldom or never seen abroad in daylight unless disturbed. Mr. E. E. Green from his experiences writes to me : " It is quite nocturnal in its habits. In captivity it sleeps all day and refuses food." When not established in the safe quarters offered by masonry, or a hole in the ground, it coils itself during the day in any convenient dark shelter, beneath the boxes or stores, or among the packages on the shelf in one's storeroom, beneath the discarded bucket or basket behind the stable, beneath one of the flower pots standing in the verandah, in a heap of kunkur beside the road, or stack of bricks or wood, behind or beneath the piles of plant stored in the Supply and Transport godown or the Telegraph Office compound, anywhere in fact that offers a convenient refuge. In such situations, besides enjoying the semi-darkness so grateful to its tastes, it is brought into convenient association with the very creatures upon which it is wont to prey, the agile, but incautious mouse, the slippery skink, and the defenceless little gecko. At night the wolf-snake emerges from its fastness, and actively pursues its quest for food. The servants are apt to encounter it in the verandah when serving dinner, the inmates of a house in any of its rooms, the sepoy in his lines, the soldier in barracks, and the warder going his rounds in the Jail. Often too it will drop from the roof into the verandah amid the family circle, from the covered way to the kitchen, or from the disused punkah-pole, or cross-bar supporting curtains in the drawing-room.

Its climbing accomplishments are very remarkable, for it often puzzles one to know how it can have got on to some of the places from which one dislodges it. The top of a window ledge, the jilmils of a door, the top of the lintel of a door which has become loosened from the masonry, a punkah-pole, or curtain rod. I have frequently had opportunities of observing this snake climbing and find that it

can do so with comparative ease even on a vertical plane, especially if the surface is a little rough. Thus I have many times witnessed it climb up the perpendicular wooden faces of its box, the boards being rough from the saw. It clambers with ease, throwing itself into an S shape, and appearing to balance itself on its tail. As one watches this performance one wonders at the support derived from the tail expecting every moment to see the snake fall, but no! the caudal extremity resting on the horizontal surface grows less and less, and finally follows the rest of the snake which adheres vertically wholly unsupported. Now some observers would have us believe that the force which operates in this acrobatic performance, is brought about by a muscular effort on the part of the snake which retracts its abdomen in such a way as to create a vacuum in its body-length opposed to the surface it is climbing. This, as in the case of an india-rubber cup which has been pressed to exhaust the air, adheres mechanically by the production of a vacuum. I happen on more than one occasion to have seen *Lycodon aulicus* moving up the glass face of its cage, it can do so in a wonderful manner till nearly all the body-length has left the floor, but though I have specially looked for it I have never been able to see the slightest indication of the muscular action referred to above, but have noticed that the whole surface of the abdomen lay pressed against the glass. I have never seen the snake succeed in scaling a face of glass except in the case of two hatchlings that I put into spirit. To my amazement I found one of these still wet from its immersion lying along the face of the jar above the level of the fluid, and here it maintained a firm attachment, so firm indeed that it almost supported the second one in its endeavours, to reach a similar position, and escape its fate. In this case also I specially noted that there was no attempt at any retraction of the abdomen. The jar in which this scene was exacted is some 5 inches in diameter, so that the curvature of the glass can have been little assistance to a creature little over 7 inches in length. The wolf-snake appears to me to climb by the aid of its ribs, and the free borders of its belly shields, and with these alone. Mr. Sinclair in this Journal (Vol. IV, p. 310) remarked upon one he saw scaling a chick stretched vertically and lashed in position. He says: "The snake evidently climbed by hitching the edges of the ventral shields on to those of the bamboo lattice of the blind, and not by winding his

body which was entirely on the side of the blind next to me, round the bamboos." As already stated it will frequently climb up into the roofs of houses, but perhaps the most remarkable example of its scansorial achievements is that mentioned by Haly*, a specimen having been caught in the lantern of the Minicoy lighthouse in Ceylon.

Food.—*L. aulicus* whilst showing a preference for lizards of the gecko family accepts with avidity other small creatures that cross its path. I have on 13 occasions known it take geckoes always of the genus *Hemidactylus*, usually *frenatus* but also *coctaei*. On 8 occasions a mouse had furnished the meal, and on 6 other occasions skinks had been devoured. In the United Provinces *Mabuia dissimilis* ?, in Burma *Lygosoma cyanellum*, and once another *Lygosoma* too digested to determine. Mr. E. E. Green tells me in Ceylon he has known it take a *Lygosoma* in captivity. Willey says its staple food in Ceylon consists of the brahminy lizard, *Mabuia carinata*.

Foes.—I have known it fall a victim to the common krait, and the habits of the two snakes are so alike that I suspect the wolf-snake very frequently meets an untimely death at the jaws of its ophiophagous relative.

Breeding. The Sexes.—As already remarked the ♀ appears to grow to a greater length than the ♂. The sexes, as regards numbers appear to be equally balanced, thus my note books show that of 73 specimens sexed, 36 were males, 37 females.

I have known the sexes in company in November in Cannanore by report. In this case the native who brought the ♂ assured me it was united with another which escaped. In January in Fyzabad two were found in company in a bottlekhana, and in Dibrugarh two pairs were killed in company one in June and one in July. The June ♀ was heavily egg-bound at the time, but only the anterior half of the July specimen which I assume to have been a ♀ was brought in, the ♂ being perfect. It is evident that they do not dissolve partnership after sexual congress for a long time, if they do so at all, but this is a point upon which I am very uncertain and a very difficult one to elucidate. The smallest gravid females I have known were both 1 foot 6¼ inches long, a length probably attained at the beginning of the third year of life.

* First Report Snakes, Colombo Mus. 1886, p. 15.

Anal glands.—I have found these glands which are supposed to be connected with the sexual functions active in both sexes, and at most parts of the year. The secretion is custard-like in colour and consistency. The copulatory male organs are beset with many minute recurved spines.

In a previous paper dealing with Russell's Viper (Vol. XVIII, p. 13) I remarked that I was inclined to think that the oldest mothers were the most fecund. My notes on the wolf-snake certainly make it appear so, for the smallest females, 1 foot 6¼ inches in length, contained 3 and 4 eggs, and the largest 2 feet 5 inches in length, 11 eggs. Further 5 of the 6 egg-bound specimens over 2 feet in length contained from 7 to 11 eggs, whilst in 8 others where the length is recorded, all less than 2 feet, only from 3 to 6 eggs were found "in abdomina." My figures are as follows :—

Length of ♀.	No. of Eggs.	Length of ♀.	No. of Eggs.
1′-6¼″ ..	3	1′-10¾″ ...	4
1′-6¼″ ...	4	2′-0″ ...	8
1′-8½″ ...	3	2′-0⅝″ ...	7
1′-8⅝″ ...	4	2′-2⅛″ ...	9
1′-8½″ ...	5	2′-2¼″ ...	5
1′-9″ ...	5	2′-4″ ...	7
1′-10¼″ ...	6	2′-5″ ...	11

Eggs.—I have had many females brought to me gravid all with one exception during the first 7 months of the year. The one exception was egg-bound in Rangoon on the 20th December. Of the rest, one in Cannanore was gravid on the 20th January ; three in Cannanore in February ; one in Cannanore, and two in Fyzabad in March ; one in Cannanore, two in Fyzabad and five in Dibrugarh in April ; one in Cannanore and three in Dibrugarh in May ; one in Cannanore, and one in Fyzabad in June, and three in Fyzabad in July.

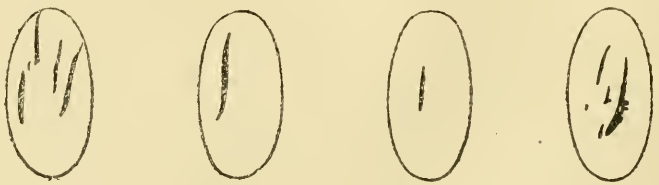
The eggs are deposited in the months from February to July. They vary in number from three to eleven but are usually from four to seven. They are elongate white ovals, equally domed at each pole, and soft to the touch, the shell resembling white kid, until vacated when it dries and hardens into a somewhat crisp parchment-like envelope. When seen "in abdomina" they are frequently but by no means always particoloured—grey and white. The grey colour appears to me to be due to absorption of colouring matter

from the intestine, for it is always seen on that part of the shell which lies in contact with the gut, is absent when the gut is empty, and present in some eggs in the string corresponding to a loaded part of the intestine. It may be originally derived from the pigment in the skins of the creatures ingested. When laid the grey colour is never visible as far as I am aware.

When deposited the eggs measure from rather less than one to one and-a-quarter inches and are rather more than twice as long as their breadth. They contain no trace of an embryo. The periods of gestation and incubation are not known to me.

Hatchlings.—These escape from the egg doubtless by means of the fœtal tooth, though I have failed to find it in the many examples I have examined. The appearance of the eggs after evacuation is similar to that seen in other species. A clutch of five was brought to me on the 18th July last year found in a Planter's bungalow. A single hatchling was present with the eggs, all of which, except a non-fertile one, were empty. I give a drawing of these eggs to show the cuts in the shells through which the young had gained their liberty. Each cut was as clean as if done with a sharp knife.

The young when they escape from the egg vary in length from $6\frac{3}{4}$ to $7\frac{3}{4}$ inches, or about one-third the length of a large adult. They are exactly like most adults in colour and markings. I have seen two of the same brood, one with very distinct yellow bars in the whole body-length, whilst the other had a few rather obscure bars anteriorly only. One of these was very vicious, and bit me more than once when handling it. It attacked, killed, and soon swallowed a young gecko I gave it.



EGGS OF *LYCODON AULICUS*.

To show incised apertures of exit made by hatchlings.

(nat. size).

Growth.—It is very difficult to follow the growth after the 2nd year from the figures to hand in my note books. It is certain however that when one year old the young have at least doubled their length being over 1 foot 1½ inches long but they hatch over such a long period of the year that the lengths become hopelessly mixed, leaving no gaps to indicate successive broods. An unusual number of specimens between 1 foot 6 inches and 1 foot 8 inches in length at the same period of the year, seems to indicate that this length is reached at the end of the 2nd and beginning of the 3rd year. Again a large number measuring from 1 foot 9 inches to 2 feet, seems to point to the termination of the third year's growth.

Distribution. (*a*) *Geographical*—Its range of habitat is very extensive. It occurs throughout Peninsular India to Ceylon and the Maldives. Westward it extends throughout the Punjab to the lower slopes of the Himalayas. I can find no record of it from Sind however. To the East it ranges through the Bramaputra, and Irrawaddy-Salween Basins (including the Andaman and Nicobar Islands), to the Eastern limits of Indo-China in the continental part of the Malayan sub-region, and through the Malayan Archipelago to the Philippines.

(*b*) *Local*—It is essentially an inhabitant of the Plains. I have known it fairly common on the lower slopes of both Western and Eastern Himalayas up to about 2,000 feet, but it appears to rarely wander above this altitude. Ferguson* in this Journal says though common in the low country in Travancore he has not recorded a single specimen from the Hills. Flower† remarked on a specimen he obtained at Penang at an altitude of 2 200 feet. Willey‡ too says that though common in the low country in Ceylon it does not appear to ascend to 3.000 feet.

In the Plains it is common everywhere, and hardly a collection of snakes amounting to half a dozen specimens made anywhere will fail to show at least one representative. I cannot recall ever having seen or heard of a specimen in or close to water, or in damp places.

Lepidosis. Rostral.—Touches six shields, the rostro-nasal sutures largest. *Internasals.*—Two the suture between them one-half to three-quarters that between the præfrontal fellows, equal to or rather

* Vol. X, p. 71. † P. Z. S., 1899, p. 664. ‡ Spol., Zeylan., Vol. I, p. 117.

greater than the internaso-præfrontals. *Præfrontals.*—Two, the suture between decidedly greater than the præfronto-frontal sutures; in contact with internasal, loreal, præocular, (sometimes the supraocular) and frontal. *Frontal.*—Touches 8 shields usually, (sometimes 6 only, when the præocular fails to meet it) the sutures sometimes subequal or more often the supraoculars rather longest. *Supraoculars.*—About two-thirds the length, and half the breadth of the frontal. *Nasals.*—Two, subequal, in contact with the 1st and slightly with the 2nd supralabial. *Loreal.*—One, twice as long as high, longer than the two nasals. *Præocular*—One, usually meeting the frontal. *Postoculars.*—Two. *Temporals.*—Two, the lower touching the 6th and 7th labials. *Supralabials.*—9, the 3rd, 4th and 5th touching the eye. *Sublinguals.*—Two pairs, subequal or the anterior rather largest, the posterior in contact with the 5th and 6th infralabials. *Infralabials.*—6, the suture between the 1st as long as that between the anterior sublinguals; the 6th much the largest, twice as broad as the posterior sublinguals, and in contact with three scales behind. *Costals.*—Two heads-lengths after the head 17, midbody 17, two heads-lengths before the vent 15. The reduction from 17 to 15 which occurs well behind the middle of the body is due to an absorption of the 3rd row usually into the 4th, rarely into the 2nd above the ventrals. The vertebrals are not enlarged, and the ultimate row but little if at all. Keels absent; apical pits present, and single (see D. of diagram). *Ventrals.*– 177 to 212, Trichinopoly 188 to 202, Cannanore 177 to 203, Burma 180 to 200 Fyzabad 193 to 208, Dibrugarh 197 to 210, E. Himalayas 197 to 212, (178 to 224 Boulenger); angulate laterally. *Anal.*—Divided usually (rarely entire). *Subcaudals.*—56 to 80 (Boulenger); divided. *Anomalies.*—Very rarely the loreal is subdivided into two, an anterior and a posterior. Commonly the præocular fails to meet the frontal. The postoculars and temporals are sometimes three. Not infrequently, the supralabials are abnormal in number, *viz.*, 8 or 10, and the 3rd, 4th, 5th and 6th may touch the eye, either two, three, or all four of them. Rarely the nasal fails to touch the 2nd supralabial. Not infrequently the anal is entire, and rarely some of the subcaudals at the base of the tail. I have lately seen one from Tindharia in which the first 3 were entire, and Flower mentions one from Penang with the 4th and 5th entire.

Freaks are apt to occur among all animals, but that rare condition known as axial bifurcation or dichotomy, which gives rise to dual heads developed forkwise on the same body has been recorded at least three times in this species. I wrote* of one such specimen in this Journal and two others are reported as being in the Indian Museum by Sclater†. *Dentition.*—The *maxilla* supports an anterior and a posterior series of teeth. The anterior set number 5, the first 3 progressively increasing in size ‡, the last 2 about twice the length of the 3rd. An arched toothless gap intervenes between the anterior and posterior sets. The posterior set numbers 10 or 12, the last 2 are about twice the size of the preceding 8 or 10 which are subequal in size.

The *palato-pterygoid* array form an uninterrupted series of which the palatine numbering 11 to 13 are rather longer, the pterygoid numbering as many as 29 progressively and very gradually diminish in length from before backwards.

In preparing a skull the minute teeth at the back are very difficult to preserve, and dissect out intact, so that usually a number considerably less than 29 are evident.

Mandibular.—Consist of two series, an anterior and a posterior, separated by a short gap. The anterior contains 5 teeth, the 3 first progressively increasing in length, the 4th and 5th equal and about twice as long as the 3rd. The posterior set numbers from 16 to 20.

These figures are given from an examination of 4 skulls lying before me.

Günther's§ statement that "Each maxilla is armed with two fangs in front, placed in a transverse line, the outer being much larger than the inner" is incorrect. The two fang-like teeth are subequal, and placed one behind the other. Similarly, the last *two* teeth in the posterior maxillary set are enlarged, not only the last as stated by him. Boulenger¶ says the maxillary teeth increase in size posteriorly which seems to imply a gradual increase. This does not clearly describe the condition. It is the last two teeth which are suddenly and distinctly enlarged.

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* Vol. XVI. p. 387.

† List. Snakes, Ind. Mus., 1891, p. 14.

‡ Only one is seen in my figure, the first two are not noticeable owing to the bending inwards of the maxilla.

§ Rept. Brit., Ind. 1864, p. 316. ¶ Cat., Vol. 1, p. 348.

Shaw's Wolf-Snake (*Lycodon striatus*).

Nomenclature—(*a*) *Scientific.*—The specific name *striatus* (Latin = striped) originated with Shaw in 1802. Russell had figured the snake prior to this in his work published in 1896.*

(*b*) *English.*—The English rendering of the specific title is not distinctive enough as it applies equally well to many others of the genus, so that I think "Shaw's Wolf-Snake" the most appropriate name for it.

(*c*) *Vernacular*—The only names I know of are those given by Russell, *viz.*, Gajoo Tutta and Karetta the latter in Hyderabad, Deccan.

Dimensions—The longest of 14 specimens measured of my own collection was 1 foot 3½ inches, and I know of no greater length.

Bodily configuration, etc—Very similar to *aulicus*, the main difference being that the belly is not angulated on either side but evenly rounded from flank to flank. Boulenger calls the head of *aulicus* spatulate but not that of *striatus*. I cannot see much difference between the two, that of *aulicus* is perhaps rather flatter, and the snout more rounded. The eye is jet-black as in *aulicus*, the scales as glossy and the tips of the tongue white.

Colour.—Varying shades of dark-brown or black above with from 11 to 18 white cross bars on the body (not including tail) usually very distinct in the whole body length, the anterior ones specially so. The anterior ones again are more widely separated than the posterior. These bars are divided more or less distinctly at the sides to include a somewhat deltoid patch of the ground colour, very nicely shown in our plate. The belly is pearly-white, and unspotted. The head is brown or black above except the upper lip which with the lower lip, and chin is pearly-white. Most of the specimens I have seen have been a deep chocolate or pure black, and the cross bars pure white. Many writers, however, say that the bars or bands are yellow at any rate sometimes. Colonel Light in a letter mentions one caught at Bhuj with bright yellow cross bands, and says several in that locality have yellow bands. He mentions another from the same locality with the bands white. Stoliczka speaks of one from the Lower Hills of Simla with 58 broadish-yellowish cross bands. I have never seen a specimen with anything approaching 58 bands which in itself suggests *aulicus* rather than *striatus*. The ventrals 182 and subcaudals 57 would equally

* Ind. Serp. I., Vol. I, Plates XVI and XXVI.

well agree with *aulicus*. Annandale* says that those from the Malakand are reported to have yellow marks. Green† mentions one from Peradeniya, Ceylon, with some of the median scales in the anterior white bands yellow, and Annandale* speaks of a similar specimen from Pamban in S. India ‡

In 5 Ceylon specimens collected in Peradeniya, I found the bands far less distinct than in Indian forms, the colour being dirty white, and the ground colour brown rather than black.

Identification.—The remarks on *aulicus* under this heading apply also here. Attention must be given to the following: (1) a single loreal touching the internasal, (2) scale rows 17 in midbody (3) nasals touching the 1st and 2nd supralabials and (4) supralabials 7 or 8.

Haunts.—I have known this snake in the house, like its commoner ally *aulicus*, one in Fyzabad came into the Cantonment Hospital, and another was encountered in the Officers' Mess of the 85th K. S. L. I. Three or four were unearthed at different times during digging operations. It hides away during the day time in holes in the ground, heaps of debris, crevices of brickwork, stacks of wood, etc.

Disposition.—All the specimens I have seen alive exhibited a very timid disposition. I never knew one strike no matter what the provocation. Usually it made no endeavour to escape but coiled itself, and if touched or teased, hid its head beneath its coils, looking out cautiously from time to time to see if the danger apprehended had disappeared. It sometimes flattens itself to the ground in a remarkable way.

Habits.—Like the common wolf-snake it is decidedly nocturnal. I met with two at different times at night on the road between the Mess and my house at Berhampore (Orissa), and on both occasions there was no endeavour to retire from the situation, no attempt at

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* Mem Asiat Soc, Bengal, t. 10, p 194.

† Spol. Zeylan, March 1905, p. 2 5.

‡ I know that *aulicus* and *striatus* are frequently confused one with the other, and I have found several specimens in various museums incorrectly identified. If one refers to the abnormalities in scaling that I have remarked upon in the two species in this paper, it will be apparent how easily a mistake may arise, since the points made use of in the separation of the two species are subject to some variation. Moreover, a mistake, I not infrequently committed in days gone by, may occur with others. It is very easy to miscount the upper labials in the *Lycodons*, and to omit to count the last which is often not so evidently one of the series as one sees in other snakes. In all cases the mouth should be opened, and these shields then counted to the gape.

menace. Except the specimens encountered while digging nearly all were killed at night. It does not appear to share the acrobatic attainments of *aulicus*, at least I have never known one leave the ground.

Food.—Three of my specimens contained skinks in Fyzabad, of the species *Mabuia dissimilis*. I have no knowledge of its gastronomic tastes otherwise.

Breeding.—All I know of this is from my notes in Fyzabad.

The Sexes.—On two occasions in August pairs were found in company. In a small heap of kunkur by the side of a road a gravid female was dislodged one evening, and a male dislodged the next morning when the heap was broken further into. On the other occasion two snakes were seen together (not united) a little way beneath the soil during digging operations. Several coolies vouched for this, one of the snakes escaped in the excitement their discovery aroused, the other the male was captured, and in the hole were 4 eggs. It is remarkable I think that the partnership had not been dissolved even after the deposition of the eggs. The male organs are beset with numerous minute claw-like appendages.

The length of a gravid female of mine was 1 foot and $\frac{1}{2}$ an inch. Mr. E. E. Green wrote to me some years ago of a gravid specimen which he identified as *aulicus* obtained by him at Peradeniya, Ceylon. I feel pretty certain that the specimen was not a Common Wolf-Snake, but Shaw's Wolf-Snake, for it was only 12 inches long, a length far more in keeping with what we know of *striatus*, and opposed to what we know of *aulicus*, the smallest gravid record of which is 1 foot $6\frac{1}{2}$ inches. Of specimens I have sexed 7 were ♂ and 4 ♀, the longest specimen 1 foot $3\frac{1}{2}$ inches being a female. The periods of gestation and incubation are not known.

Season.—Shaw's Wolf-Snake breeds at about the same season as the Common Wolf-Snake. I have known a gravid female with small eggs in July, one gravid with large eggs in August, and the deposited eggs alluded to above were found in August. Mr. Green's specimen was also gravid on the 30th August.

Eggs.—This species is not so prolific as *aulicus*, the eggs numbering from 2 to 4. They are very large for the size of the snake, and much elongate, I think, more so than those of *aulicus*. They vary from 1 to $1\frac{1}{5}$ inches in length, and are about $\frac{7}{20}$ of an inch in

breadth. Otherwise they are just like those of the common wolf-snake.

Distribution—(*a*) *Geographical.*—This species extends further West than the Common Wolf-Snake, but not nearly so far East, its limit in this direction being proximately the longitude of Calcutta. It occurs throughout Peninsular India and Ceylon. On the West it extends through Sind and the Punjab, Baluchistan, and Persia to Transcaspia.

(*b*) *Local.*—Appears to be chiefly a snake of the Plains, extending to low hills to about 2,000 feet.

(*c*) *Numerical.*—Though I think it has claims to be considered one of the common snakes of India, it is not nearly the common snake that its ally *aulicus* is. In Fyzabad I got 13 specimens out of a total of 704, but whether it is more plentiful there than in other parts, I cannot say. I saw 3 or 4 specimens in the few months I was stationed at Berhampore (Orissa).

Lepidosis. Rostral.—Touches 6 shields; the rostro-nasal suture longest. *Internasals.*—Two, the suture between them $\frac{1}{2}$ to $\frac{2}{3}$ that between the præfrontal fellows, about equal to the internaso-præfrontal sutures. *Præfrontals.*—Two, the suture between them distinctly greater than the præfronto-frontal; touch the internasals, loreal, præocular, supraocular and frontal. *Frontal.*—Touches 6 shields, the supraocular sutures longest. *Supraoculars.*—$\frac{2}{3}$ the length, $\frac{1}{2}$ or less than $\frac{1}{2}$ the breadth of the frontal. *Nasals.*—Quite divided by the nostril: touch the 1st and 2nd supralabials. *Loreal.*—One, about as long as the nasals taken together; in contact with the internasals. *Præocular.*—One, not touching the frontal. *Postoculars.*—Two. *Temporals.*—Two anterior. *Supralabials.*—8 normally, the 3rd, 4th and 5th touching the eye. *Sublinguals.*—Two pairs, the posterior rather shorter and in contact with the 5th and 6th infralabials. *Infralabials.*—6; the 6th largest, twice or nearly twice as broad as the posterior sublinguals, in contact with 3 scales behind; the suture between the 1st about equal to that between the anterior sublinguals. *Costals.*—2 heads-lengths from head 17, midbody 17, 2 heads-lengths before vent 15; the reduction from 17 to 15 occurs well behind the middle of the body and is due to a confluence of the 3rd and 4th rows above the ventrals usually, sometimes the 4th and 5th; keels absent; apical pits present, single; the vertebral row not

enlarged; the ultimate not or barely enlarged. *Ventrals.*—Not angulate: 153 to 178 (Boulenger) one of my Fyzabad examples 179, one in the Indian Museum from Malakand 179, another from the Perso-Baluch Frontier 196. Stoliczka's specimen from below Simla with 182 I consider an *aulicus*. *Anal*—Divided. *Subcaudals*—Divided, 42 to 66 (Boulenger). In two Ceylon specimens I count 35 and 39. Russell's two specimens 40 and 41, the latter from Hyderabad, Deccan.

Anomalies.—In a specimen in the Indian Museum from Malakand the loreal is dual on both sides, the anterior small shield touching the internasal and make these shields appear as four. The nasals occasionally touch the 1st only of the supralabial series. The anterior temporal is rarely a single shield. The supralabials are rarely 7 with the 3rd and 4th touching the eye, 8 with the 4th and 5th touching the eye, or 9 with the 3rd, 4th and 5th touching the eye. I have found the anal entire in one Ceylon specimen, and in Russell's Plate (XXVI) this shield is shown entire.

Dentition.—Very similar to that of *aulicus*. *Maxilla.*—This supports an anterior and a posterior set separated by a considerable edentulous interval. The anterior has 2 (3?) progressively increasing teeth, followed by two large subequal teeth as in *aulicus*. The posterior set has 4 subequal small teeth followed by two large subequal ones.

Palato-pterygoid.—The palatine bone supports 11 teeth, the pterygoid I cannot give, believing my only skull to be imperfect. Both sets are small and subequal. *Mandibular.*—Anteriorly 3 progressively increasing small teeth followed by two subequal large ones, then a short gap sufficient to accommodate one tooth, followed by 13 small subequal teeth.

In this species the *maxilla* is distinctly shorter than in *aulicus*, supporting 4 small teeth in the posterior set instead of 8 to 10. The two enlarged posterior teeth are situated beneath the middle of the eye, and at a point well in advance of the optic foramen in the cleaned skull. In *aulicus* these two large teeth are exactly opposite the optic foramen, and beneath the back of the eye. In the mandible there are fewer teeth (13) than in *aulicus* (16 to 20.)

(*To be continued*).